

March 8, 1930

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AVIATION

James W. Harrison
Detroit, Michigan

Contents for March 8, 1930

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COMISC

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West—for a battle with Old Man Winter over a 3,500



Major Ralph Rhea, commanding officer, Arctic Patrol flight

mile frontier, to Spokane, Washington, and back. No beads blaring, no nutty uniforms and polished boots, no cheering air-raid crowds on this trip. This was grim business—a supreme test of a fighting unit operating far from its home base in the dead of winter.

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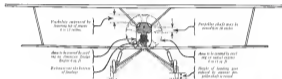
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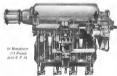
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THE OLDEST AMERICAN AERONAUTICAL MAGAZINE

A MONTHLY PUBLICATION ESTABLISHED 1910

EDWARD P. WARNER, Editor

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The Waters Bill

THE BILL introduced into Congress by Representative Waters, designed to revise the whole structure of the contract air mail service, may well have been reported out by the Post Office Committee before this editorial appears. If so, our subject matter may seem very stale, but we shall risk that. The fundamental lines that the bill raises cannot be finally disposed of at a stroke. They will arise again and again and discussions will always be in order.

The more often we read this measure, the more vivid our cautions become. As we first read the bill we took it that the object was to provide for increased traffic by giving the air lines ordinary first-class mail matter to handle when that could be done without loss to the government. If an air mail contractor is already carrying a thousand pounds of air mail each day between points six or eight hundred miles apart, the additional expense for an extra thousand pounds could be many times less than enough to make it worth while transporting regular two-cent mail. The Waters bill itself provides that there shall be no payment of over \$1.25 per mile for two thousand pounds. If that rate is a fair one for the first ton, a second like treatment of load could certainly be handled at under \$1.00, which could be equivalent to a charge of 40¢ per pound over an eight-hundred mile course such as that between New York and Chicago. At that rate, ordinary letter mail between these two cities could well be handled by air.

Unfortunately, Postmaster General Brown has stated any such bright prospect. In testifying before the House Committee on Post Offices, he gave assurance that there was no intention of carrying mail not bearing the special air mail surcharge.

With that declaration the measure loses most of its charm for us. We feel no enthusiasm for the proposal

to reserve minute spaces on passenger planes for air mail and make a proportionately small compensation, which the Postmaster General estimated at something between ten cents and thirty cents a mile. Even at that rate his estimated figure of \$66,000 a month to be paid to passenger lines would permit of such mail subvention upon less than one-third of the passenger mileage now regularly being flown.

Broadly speaking, there are just four things that can happen to the air mail in its financial aspects aside from leaving it as it is. There may be simple redistribution of income among the operators upon false lines than the present ones, which give some contractors three times as large an income as others using the same general type of equipment and having similar problems. There may be (we earnestly hope, there will not) a reduction in air mail rates by the government. There may be an arbitrary increase in the interest of more liberal support of existing air transport systems. If anyone thinks that is likely, we reminded him to the President's recent utterances on the need for guarding against increase of government expenditures. Finally, there may be an increase in income compensation to an income in service rendered by the contractors.

We had hoped that the Waters bill took the fourth alternative, but seemingly our hopes were vain. Upon the interpretation that seems to develop from the recent hearings, the measure implies primarily a redistribution of income among the contractors, which was ascertainable in some form, with the added tag to passenger lines of small payments, more or less arbitrarily allocated. We have already indicated our very limited interest in that proposition, although we should be warmly in favor of permitting the passenger lines to carry a substantial amount of current first-class and air mail at a low enough

rate to protect the government against actual loss on the mail matter handled.

The proposed reduction of authority to the Postmaster General to issue contracts and route certificates by negotiation without competitive bidding, while we fear that it will never get through Congress unscathed, would be a most helpful one as long as the Postmaster General's office was filled by a reasonable and impartial and far-sighted man. It does nothing, however, to terminate the discussion upon a fair basis of compensation which has been going on for some four months. If a satisfactory formula has been developed, it can be put into force at once under existing law without waiting for new legislation.

To counterbalance the limited benefits that the passenger lines would derive from the new measure applied to the Postmaster General suggests, the bill has one definite and serious point of weakness. It largely removes the incentive for air mail contractors to solicit traffic. The postage handled by all the lines together during the past year would have been far smaller than it was, had it not been for their individual and collective work in selling public attention to the service. The Post Office Department's facilities for selling a new idea are far inferior to those of Western Air Express, National Air Transport or the Aeronautical Chamber of Commerce.

This desire to get away from contracting on a weight basis, either flat-rate or sliding-scale, seems to be an admission with the present Postmaster General. He is quoted as saying in the recent hearing, "It is not good business—or, fact is, it is immoral—to make the air mail operator pay for the amount of mail he will have to carry from day to day."—*Ironworld*, [January]. Why? Is there a business man to be found anywhere who does not have to be "paid" on the extent of the use that he can persuade the public to make of his service? Why exempt the air mail operator from the necessity of making an intelligent forecast as that same is the first instance and then doing everything possible to improve the public response?

Mr. Thorne offers one very definite reason for his objection to contracting on weight rather than space. He speaks of the inherent risk that now exists "for contractors to walk their volatile but unskilled practices." The inherent risk is not in the present law but in the present contracts. Where contractors have needed space commitments to themselves along their own line, it has been because of a system of compensation which promised a low line to receive compensation disproportionate with present postage rates. Review the compensation schedule, and the unskilled practices disappear. Adopt the Warren bill as it stands, and we are very much afraid that there will be a gradual slackening of the intensive advertising campaign that has promoted the air mail.

This expression may seem very insensitive. We

have already warned our readers that the term precisely describes our own state of mind. We favor the measure, if it can now proceed in earnest. The friends of aviation in Congress should stand firm against any winking away of the broad discussion intended to be assigned to the Post Office Department and of the previous far-reaching power air transport effort. If those moving changes attract serious attention, we should prefer to see the air mail work along upon the present legal footing, with compensation for postage and as a sliding scale.

//

One Ticket or Four?

RATE REDUCTION is the order of the day. The air lines are vying with each other in cutting their charges to railroad levels or below. They are taking a lesson from the back of Henry Ford. Quantity production has been effective in reducing manufacturing costs throughout the range of industry. It can be equally helpful if applied to the business of furnishing transportation. The struggle against overhead is waged in terms of increasing traffic and of a wider distribution of accessible ports.

On the other hand, the increase of traffic does not stand alone as a device for combating excessive high expenses. There are direct economies that may be affected which are independent of the scale of operation, and which need not be detrimental either in safety or in service. There is particular danger of duplication and waste in the distribution of tickets.

While nearly every tourist agency and hotel will book air passages, each line must have some central point of distribution. A year ago there was a tendency which was parallel with recent developments in handling railroad passenger traffic to open consolidated ticket offices, with a desk on a table or a section of a counter for each co-operating line. Unfortunately, the passion for organization shows itself here as elsewhere, and some of the consolidated offices have fallen upon evil days. One of the most conspicuous of the pioneer attempts in that field, in an important midsize western city, was forced to close its doors a few weeks ago and the principal reason was that four of the air lines operating there had established independent ticket offices in direct competition with the consolidated one. There was no revenue save to pay up the directors.

We know nothing of the local situation in that community, and there those who have been good reasons for the establishment of one office by many but lacking specific evidence we doubt it. It is safe to say that the aggregate cost of ticket distribution has been increased by the change. It is almost sure that the effort upon the branch of the traveling public has been unfortunate, for the consolidated ticket office can be an important institution

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is an important location, symbolizing the solidity of air travel. Its address and when he might see you have at least the same of the particular line that he wanted to patronize in an emergency. From every point of view we find ourselves led to advocacy of the unified ticket distributing agency. Instead of fielding their tests and taking into the night, they should be multiplexed in a center.

//

Shorelines and Skies

IN THE LAST YEAR there have been five major crashes in this country due to transport air lines colliding with the ground while in full flight through adverse weather, and at least one such tragedy in Europe. That unhappy experience, indication of calamities were needed, that the policy of flying high transport planes through bad weather by staying down when sight of the ground is not to be accepted blindly. The operator of a small single-engine plane, who cannot depend upon his single engine to carry him through above the storm, who has no radio equipment to tell him what to expect ahead, but who can depend upon the maneuverability of his plane to prevent collision with unexpected obstacles or to make a reasonably safe landing under adverse conditions, will probably always follow the practice of "hedge-hopping" when the ceiling is low. For the large transport planes, of constantly increasing size, increasing landing speed, and decreasing ability to maneuver sharply, we must look for another technique.

Small boats usually hug the shoreline during bad weather because of the protection afforded, their low speed, ability to maneuver quickly when among anchor obstacles and the possibility of running through the breakers and beaching the boat in the last emergency. Coastwise liners take care to alter a course by compass, but far enough away from the coastline to insure safety from unexpected contact with rocks or reefs. The ground is to the transport plane what the coastline is to the ocean-going vessel, a hazard to be avoided while en route from port to port. Just so large ships compute a course away from land so it seems logical to expect that large transport planes will compute a course known to be above any early obstructions. By means of directional radio and the radio compass it has been proved possible to follow a true course without any other means of reference to points on the earth. Altitude can be maintained by instruments, as can the stability of the plane when flying blind. Two-way radio communication already in use, makes it possible for the co-pilot of a transport plane to receive weather forecasts while in flight and to know whether conditions at the terminal are favorable for landing. A further radio development which we hope to see perfected, would be a "fog horn"

apparatus for use of all planes flying through adverse weather. Such a device, with directional reception, would make it possible for a pilot to know when another plane was in a course converging into that of his own craft.

Many of the technical developments that we want to see are not yet ready for practical application to everyday transport operations. No matter. Let us for our attention upon them. The more faithfully we work toward the perfection of aviation along the sure foundations of safe lines as those followed by marine navigation, the sooner we may expect to witness the virtual suppression of weather as a hazard.

//

Before the Dawn

THAT IT IS usually darkest just before the dawn is, is a fact well known to those of our friends who are sufficiently early in the morning sufficiently late. This simple truth may well be considered in connection with the clouds of gloom which have recently been diagnosed relative to the development of air transport, chiefly by those who least understand that development. That commercial air transport operations conducted during 1929 did not show a profit is neither surprising nor discouraging. It took the railroads many years to get on a dividend paying footing, or to evolve a sound rate structure, notwithstanding vast land grants, almost exclusively generous financial backing in some cases, and the fairly recent need for new services.

We of the aeronautical industry must not lose sight of the fact that transport operations lie at the very foundation of commercial aviation development. Regularly operated transport lines are the proof of safety; the demonstration of technical progress in all phases of design, from airports to instruments, the building of a consistent air traffic and a dependable market for new planes, and the leading requisites of airmanhood. While we most eventually produce a profit from air transport operations in order to place commercial aviation on its proper plane, the industry could well afford in the long run to calculate transport lines for a time as a measure of general upbuilding.

Nothing is a certainty with, however, be necessary. The lost air lines are still on a good financial footing. It is little more than a year most of the preliminary experiment has been accomplished. The transport operators have found rates, routes, equipment, schedules and the wishes of the public, and the lessons learned have been valuable. With the knowledge gained you may produce and with every nerve strained for increased convenience, reliability, economy and always and especially for safety, there is every reason to hope that the turning of the financial corner for the transport operators need not be far away.

Engines AND Accessories

AT THE ST. LOUIS SHOW

Some General Remarks and Brief Descriptions of Power Plants and Other Exhibits

AS IN previous shows the air-cooled type of engine predominated in point of numbers, in the engine exhibits, the only water-cooled representative being the Curtiss Conquest and Grand Conquest models. A notable tendency toward the inverted-in-line type of air-cooled engine was observed and exemplified by the display of the new Rover engine, the Curtiss Crusader, the new Panchfield and the Chevrolet engine. This is the first airplane show in which so many inverted engines have been displayed. The Rover engine like its predecessor, is a four cylinder type with a higher rating than the former model, while the Panchfield and Curtiss products are six cylinder types.

Engine manufacturers, judging from the power plant exhibits, are striving to attain greater accessibility of parts for service and are gradually refining the vital portions of the service problems. Advantages seem to have been taken of the excellent manufacturing work of the Society of Automotive Engineers and greater care is being made of standard S. A. E. drawings for accessories. Precision is being made for installation of starters and generators in a greater number of engines. Cases of improved distribution and availability are observable in a number of the new models and the work of the General Electric Company in the development of built-in rotary starters is noticeable in a number of designs. An interesting use of aluminum-aluminum alloy castings can also be detected.

Two engines of the L head type were shown, those of the Western Engine Company and Seelye Aircraft and Engine Corporation. The importance of supplying airplane manufacturers with castings such as engine is being realized by engine manufacturers and several interesting types of casting were shown developed for a particular engine and purpose. The first exhaust system, first introduced in this country in the 36 series of Wright engines is also being used extensively by other manufacturers.

No new developments in gearing or supercharging were in evidence. The most active developments seem to be in the low horsepower ranges.

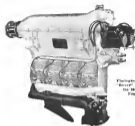
A number of recently developed engine models were shown, some of these by the relatively new companies in the industry. Many of the concerns which have heretofore made but one type of engine have introduced new



The 16-cylinder Katochase L head engine. Not much external clearance.

models to broaden the range of requirement that their products are suited to fill.

Alexis type "B" engines, which already have been described, were shown together with a number of their parts and accessories. One of the first American produced Hispania engines was displayed, and this power plant is representative of the planned production for 1930 of the E. W. Bliss Company. This production is to include the direct drive, geared and supercharged versions of various compression ratios developed by the Bliss Company of England. A feature of the American product is the use of a drop forged, aluminum alloy, port house type of head fully machined from the solid and secured on. General models are fitted with the Farwell reduction gearing while the supercharged type with the Standard Ross Jager type supercharger.



Photograph of the new Rover developed by the Hispania Aero Engine Co.

A noteworthy Brownback Tiger C-300 engine driven by an electric motor and disassembled internally, as well as a complete set of finished parts were shown by the Light Manufacturing and Foundry Company. The Aeromarine division of which is now producing the Brownback engine. This engine employs a slipper type connecting rod having large bearing area. Lubricating oil is carried in various points in the crankcase by means of steel tube cast in the crankcase rather than by passages drilled through the aluminum. A special arrangement for carrying excess oil away from the cam follower guide is used, taking the oil vertically from this point and using it to lubricate the upper end of the cylinder bore. Detachable cylinder heads are provided and a gasket is used between head and cylinder. No studs are screwed into the aluminum heads. Thrust is taken directly at the forward crank throw and carried on a web cast in the crankcase to the through-bolt, which is attached to the engine casing. The entire engine is built from parts

made to specified dimensions, special jigs and fixtures being used in order to facilitate field overhauls and replacement of parts. All shafts are fitted with bronze bushings and the entire crankshaft and connecting rod assembly is machined and polished in an attempt to prevent cracks appearing in the rod ends.

The Brownback Tiger is a six cylinder, staggered radial type, rated 90 hp at 1700 r.p.m., and having a dry weight of 273 lb. The bore is 4.33 in. and the stroke 4.93 in. while the compression ratio is 4.8. Displacement is 3.97 cubic. The overall diameter is 37 in. and the diameter of the rotating ring 13 in.

A new engine manufactured by the Chevrolet Aircraft Corporation which is headed by Mr. Louis Chevrolet, was shown for the first time at St. Louis. The model D-33 Chevrolet engine is a four cylinder inverted type rated by the manufacturer 90 to 100 hp at 2,000 to 2,100 r.p.m. This engine has an unusual valve action and the cam shafts are driven by a triple length chain



The Wright engine installation in which 2-6, 6-cylinder and 8-cylinder power plants were shown.

and train of gears. Circulation of oil from the crankcase feeds the cam drive at all times. Oil is forced by a dual gear pump through the crankshaft and is thrown by the crank to the pistons. The pump also forces through the cam shaft lock to the bearings. Special ducts at each valve carry a flow of oil to the valve housing where it is sprayed over the cups and springs. Oil is ejected from the valve housings through holes in the valve cups to the cam shaft housing is returned to the crankcase by a scavenger pump. Cylinders are of chrome molybdenum steel and heads are aluminum alloy covered and shrunk to the cylinders. Special exhaust outlets are located in the heads between the cam shafts, thus eliminating any obstruction to air flow through the pipes. Pistons are of aluminum alloy with four rings. Connecting rods are forged from duralumin and ball-bolt head. The crankshaft is of chrome nickel steel and has five main bearings 2½ in. in diameter. Crank pin bearings are 2½ in. in diameter. A down draft carburetor with hot and cold air control is used and special fuel pump is driven from the end of the cam shaft. This pump has a capacity of 29 gal. per hr. at 1,000 r.p.m.

A NEW TYPE of exhaust collector ring and valve in which the cycling controls for back pressure the cylinders was featured in the Comet engine exhibit. This exhibit, which was one of the prime exhibits at the show, embodied a complete assembly of pistons and connecting rods in motion so that their actual operation could readily be appreciated. Another feature was the exhaust cylinder showing the unusual Comet valve action.

Continental Motors Corp. exhibited at St. Louis the latest Model A-70, designed to develop 165 hp. at 2,000 r.p.m. A 54:1 compression ratio is used and the bore and stroke are both 5½ in., giving a total piston displacement of 544 cu. in. The dry weight of the engine, without water, is 425 lb. or approximately 2.5 lb. per rated hp.

Valve boxes are cast integral with the cylinder heads, and easily removable covers are secured to them. Hard alloy valve seats are shrunk in place. Inlets are also used for intake plug openings. All accessory drive gears are forged integral with their shafts and pin bearings

are used, except in the case of the pump shaft, which is mounted on ball bearings.

All accessories on the entire engine are fitted with standard S.A.E. mountings allowing the use of any standard piece of equipment.

The new Parnell engine, of the inverted air-cooled type, attracted much attention at the show. The engine is six-cylinder with a bore of 3½ in. and a stroke of 5½ in., giving a displacement of 394.4 cu. in. The rated horsepower of the engine is 110 at 2,000 r.p.m. and the maximum power, 122 hp. at 2,100 r.p.m. The weight of the engine, dry and without exhaust stack, cooling or propeller hub is 325 lb. The fuel consumption, as recorded on a 30 hr. test run, is .560 lb. per hp. hr. and the oil consumption .008 lb. per hp. hr.

The engine presents a frontal area of 2.8 sq ft. and allows room for the pilot, underneath at the highest point of the crankcase is 10 in. above the propeller shaft. The valves of the engine are set in the cylinder head at an inclined angle of 60 deg. and are seated upon stems of aluminum bronze, which are shrunk into the head.

Valves of this engine are of the overhead camshaft type. The camshaft and rockers are supported and actuated by a housing, the cover of which serves as the intake air scoop.

Two Scudilla magnets are mounted on locknut brackets at top of and near the rear end of the upper crankcase. Flexible couplings provide means of inspection timing. Ignition wiring is in a conduit within 6 in. of distributor. Main bearings are lubricated through a hollow crankshaft.

The Gypsy engine, trailing shown by the Wright Aeronautical Corporation, is in three sections and is simply attached to the engine, the lower portion of vertical section containing the distributor and being actuated by means of a pulley and spring arrangement which revolves around a nut on a few moments. In closed position, this covering is designed to provide the desired air flow around the cylinders as well as the desired manufacturing for the place for which it is designed. Official introduction of the new Kinner 190 hp. engine was made at the show by the Kinner Airplane and Motor Corporation. Like the Kinner 8-5 100 hp. engine which the company will continue to manufacture, the 190 hp. engine is a five cylinder, radial, air-cooled type. It develops its rated horse power at 1,500 r.p.m. and in tests it has been run for long periods at 1,500 r.p.m.

The new model has a bore of 5½ in., stroke of 5½ in., and a total piston displacement of 715 cu. in. Its compression ratio is 50 to 1. Weight is 415 lb. dry without hub, air heater, cooling fan, starter, generator and fuel pump. Ignition is provided by two Scudilla magnets. The Stromberg carburetor is standard equipment. Overall diameter of the engine is 49½ in., the total length

THE BROWNBACK

"Tiger"



Front view of the Brownback-Tiger engine



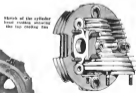
Accelerator gear at rear of engine



Double three-crank shaft used on the Brownback



The Sigsbee connecting rod assembly



March of the cylinder head valves showing the top cooling fan



Rear half of crank case with accessory gears in place



Photo showing Comet back bearing moving connecting rod and piston assembly

New ENGINE FEATURES

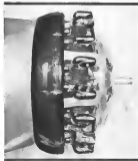


Sketch of the side deflector between the cylinders on the "Gipsy"



The "Gipsy" main drive mechanism

The new cooling system developed by Pratt & Whitney explains for the "Wasp" Junior engine



The new "Gipsy" engine cooling system developed by Whittle engineers



Two views of the Hercules engine



without starter or governor is 34½ in., and the diameter of the mounting ring is 34 in.

It appears the new engine resembles the K-5 100 hp model. A simplified induction system, freedom from exterior plumbing, and simple gear gear accessory drive are characteristic of the new engine. Since the main auxiliary and many of the accessories and fixtures used in the production of the K-5 can be used in the new engine, the new model, quantity production can be easily attained.

Exhibited by the Lambert Aircraft Engine Corp. was a new 90 hp. radial engine. Utilizing a short stroke to gain the advantage of small head resistance, through a smaller overall diameter, the engine presented a very compact appearance. The engine weighs 214 lb., minus equipment, and has a total displacement of 266 cu. in. It delivers its rated power at 2,375 r.p.m. Ignition is provided by two Schottky magnetos. The bore is 4.25 in. and the stroke is 3.75 in.

Latest Le Blond models including the Sixty-six and Sixty-nine also were shown.

The new Lycoming R-680 nine cylinder radial aircraft engine was also exhibited at St. Louis. Having a bore of 4½ in. and a stroke of 4½ in., giving a piston displacement of 680.66 cu. in., the engine is rated by the Department of Commerce at 230 hp. This is approximately 2.24 hp. per lb., at rated speed. This engine is known as the model R-680, and holds a Department of Commerce Approved Type Certificate.

A sprouting curve on the cam ring, and the employment of a rotary induction system have contributed to the smooth operation.

All oil pipes have been eliminated, both the pressure and return using systems operating either through conduit or drilled holes in the castings.

Delicate gas-valves and high speed rotary parts have been, so far as possible, eliminated. Ignition is furnished by one dual type vertical magnetos with two independent distributors. The whole ignition system can easily be checked, should it be desirable. The induction system consists of one pressure pump and two scavenger

pumps built into one complete unit. Starter and governor drives are mounted in easily accessible parts of the engine and starter operates directly on an extension of the crankshaft. The governor drive is such that it may be withdrawn for inspection.

The Society Aircraft & Engine Company of Holland, Mich., had on display at the show two new L head engines. These engines were of unique design in the small field. Particular attention has been given, in the design to accessibility and simplicity, including the reduction of the number of parts used.

Two models of these engines are in production now at the company's plant. The first of these, SR-3, Model L, is a 30 hp unit, with a bore of 4½ in. and a stroke of 4½ in. The engine develops its rated hp. at 1,800 r.p.m. Equipment includes Schottky magnetos and a Stromberg carburetor. The total weight, with all accessories, is 142 lb.

Oil and scavenger pumps are of the gear type. The propeller drive bearing is of radial ball type, and the main bearings are of the roller type. The engine has an overall diameter of 29½ in.

The second engine has a 4½ in. bore and a stroke of 4½ in., the same as the previous model, but has five cylinders. At 1,800 r.p.m. it delivers 70 hp. Its weight, with all accessories, is 186 lb. and the overall diameter of the engine is 31 in.

At rated speed, the engine has a fuel consumption of 0.06 lb. per hp., with an oil consumption of 0.016 lb. per hp.

The unique feature of these engines is the L head type of valve. By use of this valve the manufacturer is enabled to reduce the number of working parts and, at the same time, the overall diameter of the engine. Furthermore, a reduction of weight is made possible. The engines present a very clean appearance, having no external valves, and good scavenging is possible.

FOLLOWING a considerable period of development the Pratt & Whitney Aircraft Co. has produced a combination exhaust collector ring, noise muffling and pre-



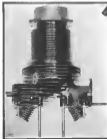
Pratt & Whitney engine with specially coated noise muffler in background

NEW Fairchild Inverted ENGINE

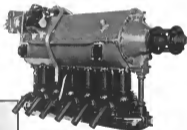


Detail of water-cooled cylinder drive mechanism

Individual cylinder drive from both for attachment of valve mechanism



View of the propeller end of the Fairchild engine. The small frontal area of the collector is apparent



Side view showing the water-cooled cylinder drive and main crankshaft drive



Valve drive mechanism detail

beater available for the new Wasp Junior engine. The new cooling is of conventional design and comes up quite high on the cylinders. It carries extensions between the push rod to prevent the air leaving at these points when the shutters are closed. It is added for efficiency and is rigidly attached to the engine. The revolving shutters operate on steel rings to reduce wear. The collector ring is placed at the rear of the engine and is surrounded by a flange which serves as a hot air vent. The collectors are elliptical and large enough to ease for the engine exhaust under all conditions and special care has been taken to exclude any hot gases which would tend to produce diaphragm action. It is fabricated in one section, each attached to a cylinder and one completely assembled with a ring of about the same diameter as the engine. It carries a single outlet for the exhaust which is connected to a lift pipe or discharges into the atmosphere. The assembly can be revolved to any of the most available positions making it possible for the outlet to be placed at any desired point. One or more cylinders may be removed from the engine without dismantling collector or controls. The obvious replacement valve, in the event of damage to one section, is also a feature. A compact control is provided at the bottom of the carburetor and is effective, though small enough so that it does not protrude from the housing.

UNDERSTANDING the features of the Pratt & Whitney exhibit, was the 300 hp Wasp Junior engine. In general the design of this power plant is identical with the Wasp Senior, the main difference being in dimensions. The new engine is 452 in. in overall diameter and has both bore and stroke of 5 1/2 in. The displacement is 985 cu in and weight less than 500 lb.

A large percentage of the parts of the larger Wasp model have been scaled down to produce the new power plant design. By using the standard rear crankcase sec-



Side view of the water-cooled cylinder drive mechanism. The small frontal area of the collector is apparent



Front view of the Wasp Junior engine

tion, the Wasp Junior has the same mounting arrangement as the larger model, providing interchangeable mounting with the Wasps.

The new Rover engine manufactured by the Michigan Aero Engine Corporation, has recently been granted Approved Type Certificate No. 37 and is rated 75 hp at 1,925 r.p.m.

The engine has a bore and stroke of 4 1/2 x 5 in., giving a total displacement of 267.28 cu in. The compression ratio is 14:1. The average weight of the engine (dry) complete with propeller, fuel, exhaust system, heater, cooling air tube and mounting legs, all of which are furnished to engine equipment is 252 lb.

The engine has an adjustable clutch to release valves, which is located just outside the delivery of the pressure pump and all oil bypassed by this valve is returned to scavenger discharge line, with which it is connected.

Two Scoville magnets and the Stromberg NA-82 carburetor are used. A simple hot air seal arrangement, which is part of the exhaust system, supplies heated air to the carburetor.

The rocker arm cover and the main cooling system are short dimensions. Strapped and are readily removed for inspection and adjustment of the engine. Provision is made for the installation of the various types of starters. These are not furnished as standard equipment.

REFLECTING the general tendency of engine manufacturers to produce several models with interchangeable parts, the Warner Aircraft Corporation has introduced a new five cylinder power plant built up of virtually the same units, with a few exceptions, as that of the Seneca. The new engine, which is known as the Junior is rated 85 hp at 1,980 r.p.m. and has a weight dry, without hub or starter, of 239 lb giving a specific

weight of 27 lb. per hp. The overall length without starter is 29 in. and the diameter of mounting ring still is 17 in. Eight 7/8-in. diameter bolts are used. Provision has been made for installation of an air, fuel, or electric starter as additional equipment. The overall diameter is 36 1/2 in.

One notable addition to this engine, which is in line with the recent design trend, is that of an exhaust collector ring.

Introduction of a radial cooled engine known as the model L-7-1 was made at the show by the Western En-



The new W-7-1, another example of the L-7 radial engine.

gine Company. This power unit is rated by the manufacturer 120 hp. at 1,500 r.p.m. and differs from the conventional product mainly in that it has an L-type of head with the resultant simplification of valve mechanism. The L-7-1 is seven cylinder type, having a bore of 4.75 in. and a stroke of 6 in. giving a displacement of 244.25 cu. in. The weight is 480 lb. and equipment includes a Stromberg V-172 carburetor and Sessile M147 CS magnets and Champion Spark plugs.



The attractive booth arranged for display of Kinners engines.

Valves are located at the rear of the cylinders so are all of the accessories and their drives. The valves have diameters of 25 in.

Probably one of the most complex and attractive exhibits at the show was that of the Aluminator Company of America. Not only material in extended shapes and sheet stock were shown but also finished products in the form of chairs for transport planes, and a number of lugs and fittings for aeronautical purposes comprised the exhibit. The exhibit occupied a large portion of one of the walls of building "A" and arranged aluminum stock cut in such shape to give the appearance of a ring ran the background of the exhibit. Incidentally, this is the first aircraft show at which the trade name Alcoa has been introduced by this company for certain of its alloy products.

A feature of the exhibit of the Bendix Aviation Corporation was the Pioneer Ocker revolving chair, invented by Captain Ocker, army flight surgeon, and developed by the Pioneer Instrument Company. This device is used in the examination of applicants for army or corps service. Four complete instrument boards for mechanical types of aircraft were shown by Pioneer in addition to its other products.

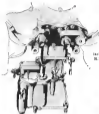
Sixty-six "Aero" struts, couplings, and drifts attractively arranged in horse shoe shape constituted the showing of the Cleveland Pneumatic Aero Company.

Besides the new instrument and unit panels developed during the year by the Consolidated Instrument Company of America, an instructive model showing the action of the visual travel rod indicating make before mere shown. This device which is a development of the Bureau of Standards is soon to be in quantity production by the Consolidated Company.

As accessories to the regular line of instruments manufactured by the General Electric Company, several new developments were shown. One of the most interesting of these was the electric tachometer. This instrument operates on the principle of frequency, and voltage generated. It is fitted with a standard S.A.E. mounting so that it is interchangeable with other types of tachometers. The AC generator is of the inductor type, having no brushes or rotating coil.

The spider rotates and the changing reluctance of the circuit. The inductive elements of a transformer surround it at very low generator output and a self-contained rectifier to provide direct current for the indicator. Use is made of the phenomenon that output voltage is proportional to impressed frequency. Total weight is about 8 lb.

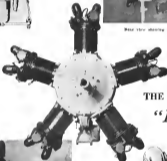
Another interesting G.E. development is the new five cylinder magnets which is essentially the British Thomson-Houston design adapted to American standards. The unit has a weight of approximately five and



Detail of the Kinners 190 carburetor mounting.



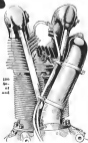
Detail view showing profile of accessories.



THE KINNER "190"



Detail of Kinners 190 carburetor showing location of fuel inlet, and needle.



Needle and needle seat, but both have counterweights.

Scintilla MAGNETOS



Sketch of magnetron showing reverse for the standard also-called Scintilla magnetron



Magnetron with magnet shifter in place



You see magnet shifter for the Scintilla magnetron



Different model magnetron



The Scintilla standard S.M. mounting base



The S.M. standard magnetron base

Double standard type magnetron

one-half pound and can be furnished with or without impulse coupling.

It is gratifying to know that more attention is being paid to aircraft plumbing and lighting fixtures as indicated by the exhibits of the Imperial Brass Company and the Dayton Manufacturing Corp. Both of these firms showed plumbing of Pullman type for transport planes. The Imperial exhibit included an ingenious combination of wash basins and toilet units in which the waste water from the wash basin was used for flushing purposes. The exhibit also featured an eight ounce welding tank for airplane use and the "Hi-Duty Buy Service Connectors," a copper tubing connection permitting tube couplings to be made without tube preparation and eliminating silver soldering. The Dayton Company exhibited an interesting line of electric lighting and other interior fixtures suitable for airplane use.

Featured at the booth of the Irving Air Chute Company was the new "Quick Connector" type parachute recently developed by that concern and intended for use in closed airplanes. The difference between this and the ordinary parachute is that the harness only, and not the pack, is worn by the air passenger and provision is made to attach pack to harness almost instantaneously if required.

AN INTERESTING EXHIBIT was that of the Sumner-Tubing Co. in combination with Metallik Machine Tooling showing various types of construction and the effect of various heat treating processes were included in a way that even the layman could appreciate. Airplane tanks and a number of stamped parts as well as other parts for aircraft use were shown by the Sumner Aero Products Corporation. The features of this exhibit included two new throttle units, light in weight for the most part and fabricated of stampings, simplifying appreciably the process of manufacture.

Boats and racing machines were shown in the Tubular Steel and Steel Company, one of the newcomers into the aircraft industry. Tubular and chassis rods and structural wiring machines also were features of this exhibit.

Aluminum for a variety of purposes was exhibited by the Westinghouse Electric and Manufacturing Company. Propellers, cabin interior furnishings, pulleys and other products of this material not now in the latest development is an attempt to relieve the material for rivet covering. Several models of sections of wing covered with Aluminex were shown and experiments are now being conducted by the company on wings covered with this material. It has been said heretofore to some extent for fuselage covering, an example of this being the Curtiss Knight which was introduced at St. Louis.

A type of hinge roof covering relatively new in this country was shown by the Mission Lambda Roof Company, a branch of the Lambda Roof Syndicate, Inc. The design of this type of roof in which thin bond carrying members are evenly distributed over the entire roof area, affording unobstructed floor space.

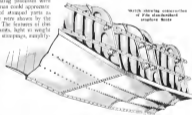
Front exhaust tubes and coverings were shown by the Buhl Stamping Company and an improved type of Chippewa spark plug also was in evidence.



Photograph of the exhibit of the Edo Aircraft Corporation

The exhibit of Edo Aircraft Corporation included the extremes in size of standardized airplane fuselages from as well as a canopy section of an Edo float to show the internal construction. Several types of aerial cameras, including the recently developed general purpose product were displayed by Fairchild and an interesting line of shock absorbing equipment was shown by Cirrus. One of the models of the Floyd Smith safety slide was included in the exhibit of the Seattle Manufacturing Co.

Aircraft finishing materials were featured by Berry Bros., the Egyptian Lacquer Company and others, while



Wing showing attachment of ribs standardized structure ribs

steel bearings were shown by Bethlehem Steel, Endicott and Wyman-Gordon. The rods, standard wire and other related equipment were featured by Stewart Hardware and MacWayne.

Working equipment in action was shown by the Air Engineering Sales Company and the Lamb Air Products Company while compressed air devices in a number of forms for aeromarine use constituted the exhibit of the Curtis Pneumatic Machinery Company. Gears and other engine parts were shown by the Indianapolis Tool & Manufacturing Company, while Black & Ducker displayed its most recent aeromarine products. Airport equipment was shown, as mentioned in the feature earlier for the show which appeared in AVIATION. Replacement gaskets in sets for a number of approved engines to facilitate overhaul were shown by the Velmec Company.

MEETINGS OF THE Aero Chamber AT ST. LOUIS

A Report on the Convening of the Fuel and Lubricant, Accessory and Material, Flying School, and Finance and Insurance Sections

By

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Editor of Aviation

and

HERBERT F. POWELL
Staff Editor of Aviation

Fuels and Lubricants

THE FUEL AND LUBRICANT SECTION of the Chamber decided that the dispensing of gasoline and oil free for aircraft use should be a thing of the past.

The practice, which had reached the point of not only furnishing gas and oil without charge as a means of gaining publicity for the products of certain refiners but the granting of gratuities in addition was dealt a death blow at its meeting in St. Louis, where the Section adopted the resolution:

"That the Chamber and all its members accept as full the rule of marketing practices adopted by the American Petroleum Institute.

"That the member companies do not donate lubricating oil or aviation gasoline to individual operators except that such companies may donate their products to engine manufacturers and airline operators for test to secure approval of their products.

"That member companies do not pay discounts, grant special discounts, or furnish free advertising for the customer right to market products as an airport.

"That no member company make any donation on money, property, or products in connection with a flying project unless the airplane is owned and/or chartered by a member company, or in which case they are to be considered under the same control and company.

"That no member company carry direct newspaper or display advertising strictly for the benefit of airport operators and/or persons not connected with the member company carrying valid advertising; provided, however that where a member company advertises its own products members may make thereon their certain field, operators and/or other persons are using their products."

This goes immensely far, farther than any previous action of any of the chamber's sections in attempted control of advertising "stunts" and gasoline work.

One outstanding example of the methods in which the resolution is directed was cited by the chairman of the advertising committee in presenting his report. He said the group is attendance at the meeting that a quantity of oil had been shipped from a refinery to the manager of an airport who gave away the lubricating

oil free of charge to those operating planes from his field. When the oil had been dispensed, the company that had supplied it sent the airport manager an amount of money equal to what his profit would have been had he purchased the oil originally and sold it at the normal retail price.

Following this and before the resolution was put to a vote, it was suggested that it be amended to prohibit the member companies from supplying oil to engine manufacturers, in return for their placing a plate on a new engine acknowledging a certain brand of lubricant. The suggestion was referred to the committee for action.

The meeting of this section of the Chamber was devoted for the most part to the presentation of committee reports. The first was that of the Committee on Fuel Standardization. This report said that because of the tremendous interest evidenced by the older engineering societies in aviation the committee believed that the aircraft industry could safely forgo the formation of its engineering society of its own for the time being. With this in view it had been agreed that the American Society for Testing Materials, operating under the American Standards Association be held responsible for the development of uniform specifications to be used throughout the country.

The committee also has organized three groups to deal with gasoline, with engine oils, and fuels other than gasoline, respectively. All societies and the aviation industry are represented in these groups. The organization is now starting its function and a meeting of all the groups is scheduled this month. Responsibility for the research necessary herein, it is possible to develop uniform specifications is being covered by the society.

A resolution was presented in the Committee on Air Fuel Safety Standards, which is composed of the Executive Committee of the Section. The vice-chairman following the Executive Committee are the chairman of sub-committees organized in the various districts they represent. Some concrete suggestions were made in reports submitted by the sub-committees, but cannot be reworded the opinion of the committee as a whole. These include the suggestions that fueling systems at airports should be of the venting system, the servicing of planes from trucks should be discontinued, except in cases of emergency, hose and jets should be kept free of water, usable fire extinguishers and asbestos suits or helmets should be readily available at airports to facilitate the rescue of passengers in case of crashes resulting in fire, and the grounding of the plane and fueling system when fueling is being continued.

Much of the work of the Committee on Fuel Safety Standards is being conducted by mail as a result of the

wide separation of its members. When the final report is completed, it will be photographed and sent to all members of the Fuel and Lubricant Section for comment. After compiling the additional material an attempt will be made to have the Department of Commerce incorporate the safety provisions in its regulations.

The Committee on Airport Fuel Servicing was chaired by the Section, and the work assigned to a representative to the safety committee. The problem of getting all companies to agree not to sell motor gasoline to airports and to limit upon the use of nothing of poorer quality than the government standard for domestic aviation gasoline was referred to the same committee.

The gasoline tax was discussed at the meeting, with the result that the Section passed a motion recommending that it would cooperate the Air Transport Section in seeking relief from the taxes now levied by the majority of states against gasoline used for aviation purposes. This was also referred to the advertising committee.

Accessories and Materials

THE ACCESSORY AND MATERIAL SECTION of the Chamber being comparatively a new one has not yet developed as any confining subjects of arguments as have some of the larger organized sections of the industry. Its meeting was devoted largely to reports on the activities of the "travel by air" campaign in which the members pledged themselves at the Cleveland meeting. S. L. Gabel of the Sunbeam Trolley Company introduced the discussion. There has been prepared a special "travel by air" program, which members of the Chamber are to be urged to use as stationary and other printed matter.

Like facilities of planes and engines, those dealing in accessories have a serious discount problem, complicated for them by the enormous number of potential dealers retail or self-helped. A particularly acute problem is aircraft parts, which are sold in the smallest quantities of the dealer who is not only in want and not in fact, and who produces himself such for the primary purpose of quick buying for a discount on the insignificant quantity of material used in his own operations. It was agreed that discounts should be liberal enough to give genuine encouragement to responsible and competent distributors, but price-cutting and the giving of discounts was foreseen as a menace which would have to be firmly met. Some manufacturers of important accessories and materials have been embarrassed by retail prices established before there was any distributing representation, when they were selling directly from the factory and retail were too low to permit the offering of a satisfactory discount without actual loss to the manufacturers, even at present levels of production. In some cases, therefore, an engine manu-

facturer has found it necessary to establish very different discounts on different parts of his line. Following the suggestion that had been made in the engine association forum session, one speaker proposed that problems of discounts and differentiation between operators, manufacturers, distributors, and individual users should all be swept away by giving discounts only on quantity purchases and making the amount dependent upon quantity, but the proposal gained no vocal support. There was a suggestion from another source that the Chamber of Commerce should present an authorized dealers' list and that discounts should be given only on those trading places thereon.

Flying Schools

IN THE MEETING of the Flying School Section of the Aeronautical Chamber of Commerce held Wednesday morning of Shreve week, preliminary discussion was held concerning the draft by the Aeronautical Branch of tentative new regulations raising the flying requirements for the private and limited commercial grades, with transport privileges available to the latter class up to the first transport plane weight class. Allowance of junior instructor privileges to the L. C. was discussed, but this point remained an open question.

Under the proposal suggested by Gilbert G. Bedell, of the Department of Commerce, the minimum age of the present 20 hr. total requirements for the L. C. license to qualify as an R. C. total with 25 hr. dual and 20 hr. solo. The private pilot grade at an approved school would be raised to 40 hr. (15 dual and 15 solo), while the new requirement for students at approved schools would be a total at least of 25 hr. solo. The morning idea, it was stated, was to further safety through stiffer requirements, with the approved school favored over the unsupervised by a larger amount than heretofore as the private license. The new L. C. privileges would be designed for the approved school only.

A study of accident data in the private flyer class would permit any change in the regulations for that type of pilot, it was stated. The proposal is to be drafted, turned over to the school operators for perusal, and brought up for further action at the general school session scheduled for the New York Air Show, May 3-10. Debate changes might be effected, September 1.

J. S. Harriott, of the Department of Commerce, presided at the meeting, which was fraught with discussion for and against changes in the present order.

Outstanding in their arguments against changes in the system were C. S. "Doc" Towns, of Cavallo-Wilde, and W. B. Flaveland, of Universal Aviation Schools, and James G. Ray, of Phoenix.

"Curtis-Wright Flying Schools are definitely op-

posed to any private license change unless it is proved that the present system is hazardous," stated Jones. "Rational requirements will simply bring too many prospective students. We are opposed to changes in the limited commercial class also," he added.

"It is better to continue and improve what we have now," said Willie B. Howland, "before breaking up and reforming the present pattern."

Later, Howland declared that as increase in road transport services through the country might be curbed by Limited Commercial pilots, then giving them added privileges. "But," said he, following a statement that the L. C. classification was a stepping stone to the transport—"why have a Limited Commercial rating? I am opposed to complications—especially to further complication."

Ray's opposition to changes were similar to those of "Cuey" Jones. "You men lean toward increase in volume of business," he said, "yet you propose to stiffen the requirements, which I think will make the volume of business worse instead of better. Many students will be cut out."

S. L. White, of Spartan Aircraft, a leader in the movement for reformation of the ratings, answered Ray at this point with the statement that sevenfold added privileges would go to the L. C. man in payment for the difference in the increased volume of added business.

"The L. C. rating," said White in his statement lowering higher requirements, "seems little to the holder, hence it should be discontinued or made to mean something."

White said that he was not in favor of the new cockpit regulations for L. C.'s which had 30 hr. required. He told of a case in which an L. C. co-pilot had taken a plane on a cross-country run only to "light" the controls where he should have eased down and in the craft lay itself in the manner of an experienced flyer. Many a Limited Commercial man lacks the necessary experience with his 30 hr.

"With any 100 hr. required instead of 30 hr. for the L. C. flyer, we might require the last 10 hr. for giving the flyer a knowledge of instruction work, which he might use in junior instruction of students up to the private pilot," said White, in explanation of teaching privileges proposed for Limiteds.

Others of the group on the instruction point, however, seemed to be somewhat busy. Apparently approved school men did not want Limited Commercial men intruding to their own schools. "You want to grant the Limited man instruction privileges, but you don't want him yourself," said someone.

In his proposal for changes, Glenn G. Blandy discussed the idea of allowing teaching privileges. "Many transport pilots themselves are trained down on instruction as it is," said he. Oliver L. Parks, of the Parks School, declared himself in accord with the changes mentioned by Blandy and agreed with him as to the instruction question. He, too, stated the L. C. must have more privileges or the rating will cease making.

"Doc" Rankin, giving the leading champion of the instruction cause. "I think the L. C. should be allowed to instruct," he said, "because I think the future lies with the private flyer. Many of the prospective private flyers are professional men outside of the cities where instruction in schools is not available. Flying clubs might be formed in these sections, and Limited pilots might act as instructors." Rankin then told how the state of

Oregon had contained several men with but 50 hr. experience, and had allowed them to instruct. "No serious accidents have been chalked against these men," asserted Rankin. Later, Rankin suggested that this be noted and approved.

Among other ideas brought out was one by Mr. Austin, operating at Pittsburgh. He said that L. C. men were limited within a 10 mi. radius of the field up to 1939 by law of experience, then might fly to California with but 1 hr. added. Austin then suggested adding to the cross-country privileges as soon time was added. Several of the group assembled believed this would still too many complications to the rating.

At the close of the meeting, Mr. Howland told of the substantial group's suggestion for rating mechanics' courses, raising the requirements from one year of flight experience in two years, with six months at a rated school to equal one year experience, and ten months at a rated institution for eighteen months of experience. This identical favorable comments all around, especially from Mr. Parks, who must be left this to be a very important item for the betterment of the field. A standard mechanics' ground course is now being drafted.

Finance and Insurance

THE MAIN FEATURE of the meeting of the Finance and Insurance Section of the Aero Chamber held Friday afternoon and presided over by Tom T. (Helenfeldt), of Commercial Insurance Trust, saw the decision on the part of the members present to split the section into two distinct and separate parts, one to be known as the Finance Section and the other as the Insurance Section.

The original suggestion was put forward by Reed Chambers of U. S. Aviation Underwriters. Mr. Chambers stated that one of the facts that there were many insurance problems that had no connection whatever with the flight instructor, he believed, that it would be a separate section the insurance men could cooperate better with all departments of the industry, than they could as part of a joint section composed of insurance and finance men. The consensus of the meeting which was made up of two finance men and five insurance men was in favor of Mr. Chambers' suggestion and it was speedily seconded and voted to request the executive committee of the Chamber to recognize two separate sections.

Until more finance men could be acquainted with the new arrangement the election of a chairman of the Finance Section was put over until a later date. Paul Broun, of the Washington office of the Chamber, was elected temporary chairman of the Insurance Section. He will keep the chair until a permanent chairman is elected at another meeting, probably during the Detroit Show in April.

As to some problems that affected both finance and insurance companies, it was agreed by both the finance and insurance men to hold joint meetings whenever such was deemed necessary.

The rest of the meeting was taken up with a discussion as to the advisability of the two sections going on record as favoring the Bureau airplane accident bill now under consideration in Washington. The consensus of the meeting was to the effect that while the availability at the Department of Commerce of Airplane crash data might be beneficial to insurance and finance companies alike, it was not desired to get on record as favoring it, but that this would make public crash data had been given much desired consideration.

THE Air Transport SECTION

Operators Discuss Existing Problems and Plan for Future Development at St. Louis Session

By JAMES P. WINES

AIRLINE operators, on building up the passenger carrying business, are phasing the cart before the horse, "Doc" Marshall, vice-president of Thompson Aeronautical Corporation, told those in attendance at a meeting of the air transport section of the Aeronautical Chamber of Commerce held in conjunction with the second International Aeronautical Exposition at St. Louis. He advocated carrying freight and express by air until aviation has been further developed.

Mr. Thompson pointed out the inadvisability of transporting passengers in bad weather. On the other hand the operators were told that aerobusiness can be flown without regard to weather conditions. Planes can be designed for this purpose, he said, so that there is little danger to the pilot now in the event of a crash. His idea was to attain regularity in flight carrying operations before attempting to create a large passenger business.

"We must come to air express," Mr. Marshall said. "At the present time we cannot fly passengers in safety at night, nor can regularity of operations be maintained at all times during the day. However, we can establish and maintain regular freight and express services, which would be more profitable to the operators. There is more return in transporting 2,000 lb. of goods at 20c per lb. than there is in transporting 12 passengers. Let us drop this passenger carrying thing as fast as possible."

Walter E. Schenck-Boss, passenger traffic manager of Deutsche Luft Hansa A. G., was then called upon to address the meeting. He cited some of the experiences of his company. Mr. Schenck-Boss said that aside from the subsidy paid his company by the government, it was bound to rely solely on the fee air passenger for revenues from the time of its inception in 1926 up until 1938. In those three years, the company operated with a deficit. For that reason the Luft Hansa established its aerial freight service, and because that did not place the loss on a parage basis it decided to carry mail as well. He then discussed passenger carrying.

"We make a practice of returning the ancient paid for a ticket less the agent's commission if the passenger is unable to make a trip," Mr. Schenck-Boss said. We believe that a better policy is falling back on the operator. If we do not return the money, the passenger will be lost to us forever."

"We also have an arrangement with the railroads operating within the German borders to facilitate the

transportation of our passengers in the event a plane lands short of its destination. If such a landing occurs, the pilot immediately makes arrangement for the transportation of the passengers to the nearest railroad station. The station ticket, through the agreement with the railroad, will exchange the air ticket, stamped by the pilot for a first class railroad ticket. The passenger, of course, obtains a refund from the airline for the difference between the cost of air passage and the cost of the rail transportation for that portion of the trip not made by air. Our air passenger tickets formerly were not honored by the railroads outside of Germany. However, an agreement has been reached which will make the system effective throughout Europe.

"Our law has as an agreement with the railroads concerning the handling of freight and express packages. Any railroad agent will accept merchandise for shipment either air or rail. The goods to be transported by air are sent from the office to the nearest terminal of the airline. Negotiations are now in progress also to place this service on an international basis.

"A YEAR BACK in 1926 we realized that an international law would be passed requiring that no nature type passenger carried over our lines, and in October, 1929, such a regulation was adopted by the government conference in Warsaw. This required that we insure the passengers for \$5,000 each. As a matter of fact, our company carries more passengers than that on each passenger. It is of both the life and accident type. If the passenger loses his life as a result of an accident to one of our planes his beneficiary will receive 25,000 marks, or approximately \$6,000. If he is injured a hospital bill of 25 marks, or \$6.00 a day is paid him. Larger amounts of insurance are obtainable if desired.

"We are enjoying excellent co-operation from the insurance companies. Of course, the chairman of our company is also the chairman of one of the largest insurance companies which may have something to do with it.

"So far as our volume of business is concerned, let me say that we did not carry as many passengers in 1939 as we did in 1938, but the financial returns were approximately the same, proving that the average passenger is not traveling a longer distance. If this continues we will soon be able to delete some of the steps on certain runs, thereby speeding up the service."

Major Clarence M. Young, Director of Aeronautics Department of Commerce, was now called upon to speak. He announced that certain requirements, with which the air transport operations carrying passengers will have to comply, are now being evolved, and then commented on the reduction in the fare schedules. He said that formerly the high rate precluded the general use of air transport but that the new rates which have been placed in effect make it available to the larger group of individuals who travel on expense accounts. It is through this group, he believes, that air transportation must be sold.

C. F. BURNING, general traffic manager of Southwest Air First Express, then told the air transport section of some of the things which have been learned by him here as a result of the experience in fares. It will be remembered that the Southwest line was one of the first to transmute the 30 per passenger mile rate.

"The first two days that the new rates were in effect showed us clearly that passengers who had been accustomed to the growth of air passenger traffic," Mr. Burning said. "But even with the low fares the airline operators must have a definite service to offer to gain the patronage of the public. Convenience too is the big factor. For example, we have a plane leaving St. Louis that is leaving the airport at 8:30 A.M. It is not convenient because it means that the passenger must leave his hotel before eight o'clock.

As a consequence, that plane is not so popular as we would like to have it. In that connection our problem is to fill the plane with passengers arriving at St. Louis on overnight trips.

"We find that the planes leaving at noon or thereafter and operating over short distances are the most popular. The answer to that is office business. If a man concludes his business in the morning and can get home on the next train, he knows that coming by air is the best reason that he will use that form of transportation. If he has to leave the home of business, though, in order to travel by air when an overnight train will take him to his destination, he will go by rail. At the present time, the short haul can be sold most readily.

"The present rate of 5 cents per passenger mile is lower in some instances than railroad fare plus baggage. However, the rates will probably rise somewhat in the future. In fact, we expect to experiment with a small increase in June. We do not feel that we can build our legs to build up the volume to an average of 10 passengers for every 34-passenger plane. With this volume, it would not be possible to make money on passenger carrying alone. The additional revenue must be obtained by some other means, such as transporting the mails or other cargo.

"We know that air line fares ultimately cannot exceed rail fares by a great deal; but I do not believe anyone knows just how much more we can charge. On some of our routes we are now being swamped with reservations. Our plan is to raise the fares sufficiently in June so that they will excuse demands we now have for transportation. When the business again reaches its present proportions, we will raise the rates again, eventually increasing the maximum charge that can be made."

The question of insurance was also discussed at the meeting of the Chamber's Air Transport Section. However, no definite action was taken. The gasoline tax

now levied is the majority of what was also taken on. The industry is now paying some \$3,500,000 annually in taxes to the states which is being utilized for road building, a was reported. A suit instituted by Boeing, Western Air Express, and National Parks Airways to test the legality of the Utah tax, so far as air transport companies operating interstate lines are concerned, is expected to establish a precedent and remove the gas tax burden.

THE MAIN PICTURE of the meeting was the adoption of the three-day program for the Second National Airport Conference, scheduled to be held at the Hotel Statler, Buffalo, N. Y., Nov. 14, 15 and 16. The morning of the first day will be devoted to registration. At noon will be a luncheon, and welcome speeches by various leaders in the airport phase of aeronautics. The afternoon will be devoted to committee sessions, at which the chairman of each committee will read a paper he has prepared on his particular subject. These papers will be commented upon by the Committee at large and changed or altered if necessary, and put into final form to be presented to the conference on the following morning.

The various committees and chairmen are as follows: Finance and Accounting Chairman, E. A. Johnson; Publicity and Public Service, Inc., Dayton Ohio; Hanger Construction, Chairman, Maj. Frank Knevel; U. S. Army: Surface Division, Chairman, Ted Knevel; of the Cleveland Airport; Cleveland Ohio: Lighting, Chairman, John Berry, Manager of Cleveland Airport, Cleveland, Ohio; Servicing Planes, Chairman, Roy Manning of Jervis Flying Service, Inc., Dayton Ohio; Department of Commerce; Communications, A. H. Ahl, Oakland Municipal Airport, Oakland, California; Sales and Advertising, Chairman, R. S. Craig of Fairfax Airport, Kansas City, Kansas.

It is planned to devote a day and a half to the discussion of the papers presented before the conference. The afternoon of the third and last day will be devoted to an inspection of the Buffalo Airport, of airport equipment installed there by various manufacturers. In addition, actual demonstrations will be made. Nathaniel E. Duffy, Manager of the Buffalo Airport, has agreed to set aside space for the exhibit and demonstration. Mr. Duffy is also chairman of the local organization committee, which consists of John Berry, Russell Hoffmann of the Desair Woodburn Airport at Long, New York, John Satterfield and Clifford J. Leis, of Buffalo, New York.

Among the resolutions passed at the meeting in St. Louis was one to invite the commissioners of aviation in the various states to attend the conference. These invitations will be sent through their respective governments. Another resolution called for the Chamber working committees to meet every three months at the airport terminals. This was passed at the complacency of the members attending the meeting that no many qualifications were being submitted. It was decided that in the future all airport information would be obtained direct from the Chamber. Another resolution adopted was to promote the safety campaign to be inaugurated by the National Board of Fire Underwriters.

BUILDING THE Plane AND ITS Engine

Technical Papers Presented in St. Louis on
Production Problems

By EDWARD P. WARNER
Editor of AVIATION

MOMENTOUS as an index of the approach of the aircraft industry to real production methods was the engaging of a production section by the Society of Automotive Engineers during their recent aeronautical meeting. Representative as they are of the automobile builders, the greatest exemplars of mass production in industrial history, the automotive engineers now for the first time recognize the term production as fully applicable in the aeronautical world, and find an established technique of aircraft manufacture deserving independent technical discussion. The very holding of such a session is sufficient evidence that as the manufacture of aircraft, as long ago in that of automobiles, the production man is gaining hold recognizing as being stamped out into a leading role, coordinate with that of the designer.

The first paper of the evening was presented by one of the foremost exponents of mass production of a standardized model, Mr. William B. Robertson of the Curtiss-Robertson Airplane Manufacturing Company. Mr. Robertson, as the president of St. Louis' largest airplane company, spoke on his home grounds.

He arranged the general topic under two headings, denoted as "production routine" and "production technique." The first covers the general organization of the factory and the production paper work. The second part, especially in the sciences of manufacture, the subdivisions of production costs and the determination of their relation to sale prices.

Production routine, Mr. Robertson reminded his audience, is obviously, governed by the quantity to be built and by the decision upon whether the construction shall be in definite lots or in continuous flow, with each part of the plane being produced at an approximately constant rate for weeks or months together. Mr. Robertson was strongly in favor of building for stock whenever possible, but discussion of that point barely enters into the subject matter. For if a product is constructed only in response to individual orders, production is the same, that interests the automotive engineer can hardly be said to exist. Assuming then that construction would be started with the wholesale deliveries of the individual machines unknown at the time assembly is started, the speaker advocated an initial run of 25 airplanes as a good average, not so small as to require hand

work and eliminate all production methods, set to large as to endanger wasteful selling up in the face of a somewhat uncertain final demand.

It is unnecessary to dwell upon the outline of the production process, or the flow of the material through the factory from its entry as raw stock to its emergence

in finished form from the last machine, as the paper work that controls the rate of flow and coordinates the work of the various departments. These things are much the same in all industries making a semi-standardized product. The one serious feature of the section of Mr. Robertson's paper was his recommendation that his associates should be issued from the 2-weekly stock-room without inspection in order to reduce overhead and secure flexibility. The association

is one in which there would be substantial difference of opinion and at which production men in some of the other manufacturing industries would be profoundly shocked.

Turning back to the control of the rate of production is the sales department the speaker suggested working on basis of monthly production orders to be issued every days before the beginning of each month. The rate of production would then be at all time established from two to three months ahead, and could not be modified in less than that time without some waste or stock storage of raw and semi-finished stock. Mr. Robertson accepted the seven-day interval as the best in which it was possible to plan a complete run from raw material to finished product ready for the market.

Production routine, to use the speaker's own term, could be borrowed almost intact from many other industries. Production technique, on the other hand, necessarily involves problems peculiar not only to the airplane industry but to each individual factory. The ladder of the Curtiss-



William B. Robertson

AIRPORT CONSTRUCTION PROJECTS

North Coast

THE NORTH COAST Industrial Airport Corp., owners of the new airport on which Station Airway is located, recently announced plans for erection of a modern administration building. The building will be the first part of a comprehensive development planned for the airport. No immediate engineering or architectural structure is required.

The building project will require the corporation staff will require an expenditure of about \$250,000. Bids for the airport project are now being considered. The corporation staff will require an expenditure of about \$250,000. Bids for the airport project are now being considered. The corporation staff will require an expenditure of about \$250,000. Bids for the airport project are now being considered.

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port are three runways 300 ft. wide with a 100-ft. gravel strip along the runway. One of the runways will be 2,000 ft. long while the third will be 2,100 ft. in length. Four tie lights will be installed.

Plans for flying the 900-acre airport are still in the planning stage. The Los Angeles County Board of Supervisors, due to the lack of funds with which to complete necessary improvements. It is thought the plan will be reconsidered as soon as funds are available.

Advised, Ore., has purchased a 60-acre tract of land about 1/2 mile south of town which it proposes to develop as an airport. Approximately 1,200-ft. runway on the northern end of the tract will be constructed and the field will be lighted.

Alaska, Inc., has awarded the contract for a 360-ft. hangar at the airport.

Central

A new airport is to be known as the Port of Omaha, it is to be located on a 100-acre tract in Omaha, Neb. The city of Omaha has purchased the land. The airport will be a 1,000-ft. runway and a 1,000-ft. taxiway. The airport will be a 1,000-ft. runway and a 1,000-ft. taxiway. The airport will be a 1,000-ft. runway and a 1,000-ft. taxiway.

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termed project but that airport will be the first of a series of airports in the area. The Washington Air Terminal Corp., Washington, D. C., has awarded the contract for 1,250,000 ft. hangar and shop building to the Baker & Wright Co. of that city.

A working crew has started to tear down the old hangar of the Boston Municipal Airport. The hangar has been in the city since 1914. The hangar has been in the city since 1914. The hangar has been in the city since 1914.

A new 750,000 ft. hangar has been completed at Rohnet Airport, Pittsburgh, Pa.

South

Report of the executive committee of the Chamber of Commerce is under consideration. The committee is under consideration. The committee is under consideration. The committee is under consideration. The committee is under consideration.

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the project but that airport will be the first of a series of airports in the area. The Washington Air Terminal Corp., Washington, D. C., has awarded the contract for 1,250,000 ft. hangar and shop building to the Baker & Wright Co. of that city.

A working crew has started to tear down the old hangar of the Boston Municipal Airport. The hangar has been in the city since 1914. The hangar has been in the city since 1914. The hangar has been in the city since 1914.

A new 750,000 ft. hangar has been completed at Rohnet Airport, Pittsburgh, Pa.

Report of the executive committee of the Chamber of Commerce is under consideration. The committee is under consideration. The committee is under consideration. The committee is under consideration. The committee is under consideration.

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Airway Briefs

The Illinois State Legislature has voted to permit port lands to assume direction of the operation of airports at port of their cities.

Arthur P. Ryan, owner, Inc., operating Red Bank (N.J.) Airport, reported to the Federal Aviation Administration that the 1,214 shares of \$100 per share preferred stock outstanding.

To make room for installation of additional regular service facilities in the existing building, the Los Angeles World Airport (L.A.W.A.) has been moved to the existing building.

Standard Airlines' route between Los Angeles and El Paso was changed March 1 to include San Diego and El Centro, Calif.

An airport and radio center for Queens Borough, New York City, between New York and Middle Village, has been proposed by the Regional Plan for New York and its Environs. It would be within 15 miles of New York City.

Western Air Express has ordered \$200,000 worth of radio equipment from Western Electric Co.

Yale Airports and Expressions Co., Ltd., has ordered a new sign plane for the Whitehouse Airport, New York. It is a single-engine biplane with 16 seats.

Since the runway was closed for the most of the day, a North American plane, a C-47, was forced to land at the airport. The plane was damaged.

Brown County Park Commission has awarded the contract to the Chicago Airport Authority, Chicago, for a survey of available airport sites and estimates of construction and operating costs at the airport.

Radio sets and being installed in all Varsity Air Line rail planes, according to a recent announcement by L. D. Cuthbert, vice president.

granted by Supreme Court Justice Charles E. Hughes. The case was argued before the Supreme Court on March 10.

Work on the Daguerre-Schlesinger airport of the Los Angeles Kansas City Airport, Inc., has been started. The airport is located in the city of Los Angeles, California. The airport is located in the city of Los Angeles, California.

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Richfield Oil Co. Names Airport Representatives

LOS ANGELES (AP)—Representatives for Richfield Oil Co. of California have been established at the airport. The representatives will be in charge of the airport. The representatives will be in charge of the airport. The representatives will be in charge of the airport.

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SIDE SLIPS

By
Robert R. Osborn

Further Reports from Side Slips' Special Correspondent in the South

And further apologies to Mr. King W. Lumber

Dear Editor

Well, Ed, it seems it is about time for me to leave "America's Most Interesting City" as I guess I am not going to be able to take on the aeronautical situation after all, so account I being in busy with other important matters.

First, in the first place the horse racing business is a terrible shape at some of the horses was running in the order I set down for them. The only solution I had for it is that some of them must have been fixed with N.A.C.A. cowling or using an level vagabondage. Finally I had considered in each of the department's expense money to the upkeep of the tracks, that I suggest to the officials they should come out of the race "The Side Slip Headway" but they didn't take to the idea much. If they were a horse in that race called "Overproduction" I'd bet the rest of the wad on his name. After an hour of the long about I picked myself long about I decided on conversation when, in New Orleans, handling was run, as I put it on the race of Paul Harmon the favorite and he came in nineteenth he about twenty horses. He pilot says he was told back to head which all the way, but what he thought was head heads was just the other horses existing by him. Somehow I was surprised the jockey didn't come in with a bouquet of daisies he had stopped to pick. Maybe this horse racing business is in about the same fix as the airplane business as I had been picking some hungry horses what had to do their grunting down here. All I hope is they not depending for their care on the prices they want. Well, Ed, I know you won't mind the expense contributing this money on account this racing business being good clean as they has a very beautiful fair grounds down here as I hope you can see it some day.

They was one tough hawk you got though—they his estimated the dog

raising altogether. When I was here last I found out all of the line dogs by a process of elimination by betting on them, as it would have been simple to just bet on the other race this time. So there was plenty of my money lost to the magazine just because they probably knew I was racing.

Now, Ed, as for my report on the golf situation. Ed, you know when Mr. Skandry is selling amphitheatres at a banquet or something he speaks of "the vast silver resources of water at sea." Well, he is certainly is right as far as this country is concerned. OK, as they seem to be vast silver resources of water wherever I happen to hit a golf ball. Sometimes it is beautiful down here in the evening with the palm, the oak, Spanish moss on everything apart. Nothing can be heard but the plink, plink, plink of golf balls in the taken on corks on the scattered ends of the so-called golfers I had had the same only a couple of times as he got so he would go off in the woods for a crash during my first couple shots. One time I was faded low when I hit a low one as it dropped on the lake a couple times on an out on the bank on the other side, as I hauled him—then him for not keeping his eye on the ball. That was the only satisfaction I had had was the game then he.

Well, Ed I am not going to do so broadcasting so to the coast that of some of my golf scores. I will only say that even if my stock had gone high that I could have a rifle, two for one, and I wouldn't be breaking no course records. The less said about that game the better Ed. Let me go ahead as if nothing happened.

The last time I was here the girls wasn't anything in talk about a rail, but they certainly had been a real improvement in their only cities which has them most beautiful now in Los Angeles and Chester, St. Philadelphia. Maybe this improvement is

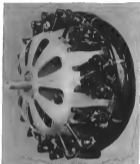
the reason they is now selling it America's most interesting city. It is even not safe to even streets here on account the other fellows driving cars watching these girls as not where they was going. Where these cars are going I mean, not where the girls are going. You can down here they either haven't heard about this long damn idea which seems to have blighted the East, or else they didn't believe it when they did hear about it. Of course it may be these are longer shorts than they has been wearing, as which costs I am sure I wasn't down here in the middle of the summer. The worst of it is the beautiful side girls in the street says what can I do for you honey? or has you been without on desire? This sort of talk is his affectionately years as the end of a girl's letter, you don't know whether to believe it or not.

Ed they in one idea I got down here which I think should be put in your technical section. You know it has always been a serious problem how to heat aircraft properly. Well, during the cold days here which lasted most of my vacation most of the virgin drivers had a fine hooded in a bucket under their seat. Why is it we never thought of this simple solution, as the barrel one of the beeches is almost new as the uppers is only a few sticks of wood. Well, Ed I won't even take out a patent on this idea but will turn it over for the good of the cause.

Well, Ed I am sorry I didn't get around to look over the box of the flying business down here, but Ed need never work to do that as when you made out my expense check you had no idea the horses would be running the way they was. A course it was your fault Ed, as when I get back I'll speak with you about coming down here again as I am sure this time is an air-entitled score as well worth investigating.

Yrs Vly Trly
THE INTERVIEW AVIATOR

NEW COWLING and MANIFOLD for WASP JUNIOR



A new exhaust collector, nose cowl and pre-heater combination is now ready for use on the "Wasp Junior" 300 H. P. engine, insuring proper engine operation under all weather conditions.

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hindered in providing for its use.

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provision of ample quantities of heated air for the carburetor under the coldest operating conditions. This new unit has been designed for durability and long service. Materials and workmanship conform to the rigid standards of Pratt & Whitney quality.

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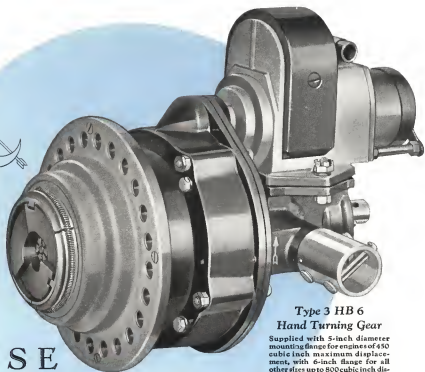
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Birmingham, England



**Type 3 HB 6
Hand Turning Gear**

Supplied with 5-inch diameter mounting flange for engines of 450 cubic inch maximum displacement, with 6-inch flange for all other sizes up to 800 cubic inch displacement. Both models furnished, arranged for either side or rear cranking. Weight of starter (including magneto) is but 17½ pounds

ECLIPSE Aircraft Engine Starters and Generators

The type 3 HB 6 Eclipse Aviation Hand Turning Gear is designed to crank the engine directly by hand power. It provides safe, dependable starting with a minimum of weight, and has proven its ability to deliver satisfactory performance on many commercial planes.

The starter consists of a reduction gear, operating an automatic meshing and demeshing mechanism through an adjustable torque overload release. This construction safeguards both the operator and the starter in case of backfire.

For easy starting, the Eclipse Aviation Hand Turning Gear is provided with a booster magneto geared to operate at high speed, thus furnishing a hot spark at low engine cranking speed.

ECLIPSE AVIATION CORPORATION
EAST ORANGE, NEW JERSEY
(Division of Bendix Aviation Corporation)